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GUITONIA TROGLOPHILA, A NEW GENUS AND SPECIES OF ANCHIALINE CRAB FROM THE GALÁPAGOS, ISLA SANTA CRUZ, GRIETA DE CALETA LA TORTA (CRUSTACEA: DECAPODA: BRACHYURA)

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Abstract.—The genus *Guitonia* Garth, new genus, is established to accommodate *Guitonia troglophila* Garth & Iliffe, new species, described herein. Collected with a baited trap in Grieta de Caleta la Torta, Isla Santa Cruz, this crab is the second anchialine species to be collected in the Galápagos Islands, the first being *Garthiope anchialina* Guinot & Iliffe, 1991, from Cueva de la Cadena, Isla Isabela (Albemarle). Unlike the first species, *Guitonia troglophila* is from a cave having no direct communication with the open sea. It shows incipient modifications toward a troglobic existence, including reduced eyestalks, attenuated appendages, and sensory setae on its carapace and legs.

In 1987, an expedition of two months' duration to the Galápagos Islands permitted the junior author to explore the marine caves, both submarine and anchialine, of several islands of that archipelago, and to bring back a very interesting collection of troglobitic and troglophilic organisms (cf. Iliffe 1991). Two species of crabs were thus collected, both of them new. The one, found in Cueva de la Cadena, Isla Isabela (Albemarle), belongs to the recently established genus *Garthiope* Guinot, 1990; the other, which came from a cave situated in a tectonic fissure in Grieta de Caleta la Torta, Isla Santa Cruz, requires the establishment of a new genus. Of apparent xanthid affinities, the new genus must be considered incertae sedis pending confirmation by the male first pleopod; the unique holotype is female.

Guitonia Garth, new genus

Carapace transversely oval, width ca. 1.46 times length. Regions well marked and granulate anteriorly, smooth and bare posteriorly. Front 0.28 times width, scarcely advanced beyond level of anterolateral marginal arc, lobes separated by a recessed pit, as seen in frontal view; a similar pit separating front from orbital margins. Basal antennal article not reaching front; antennules folding transversely. Orbits failing to close externally at level of postorbital (first anterolateral) tooth, instead communicating by means of shallow trough or gutter with second anterolateral tooth. Teeth 2–5 arcuate, marginally denticulate, incurving, third tooth longest.

Chelipeds unequal, major manus high, with broad digital tooth; minor manus elongate, fingers slender, deflexed.

Walking legs attenuated, margins spinulous and hairy, dactyls straight.

Female abdomen with seven segments; male unknown.

Type species.—By original designation, *G. troglophila* Garth & Iliffe.

Etymology.—The genus is named for the distinguished carcinologist, Danièle Guinot, in the form of an anagram, in which the first three letters of the name read forward, the last three, backward.

Remarks.—Because of the provenience of this unusual small crab, an anchialine cave in the Galápagos Islands, troglomorphic adaptations, such as absence of color, absence

of corneal pigmentation, reduction of eye size, attenuation of appendages, and provision of sensory setae to compensate for lack of vision, were anticipated. Although slightly pinkish or orangish when received (from memory, as no color notes were taken), the crab is now uniformly grayish white. Eyes and eyestalks are reduced in size, but have the corneas black-pigmented. The minor cheliped and walking legs are slender and attenuated. The many sensory hairs, or setae, are found on the carapace and minor cheliped, but mainly on the walking legs, where they may serve as food-locating mechanisms in the still, lightless waters of the cave. Those on the mouthparts (maxillipeds) may perform sensory functions consistent with their length and delicacy.

The cave from which *Guitonia troglophila* was collected was inhabited by a number of other troglobitic crustaceans, including ostracods, amphipods, and an atyid shrimp, whose nearest relatives are to be found in caves in the western Atlantic, particularly in the Gulf of Mexico and Caribbean Sea. It was postulated by Kornicker & Iliffe (1989) that their ancestors reached the Pacific before the closure of the Panama land bridge in [mid-] Pliocene. In the case of the ostracod *Danielopolina* and six other invertebrate genera having an amphi-American distribution, their colonization of caves may have begun as early as the Mesozoic, with dispersal through sea-floor spreading (by movement of Tectonic plates). Their fossil record also suggests a Tethyan origin. The closest relatives of *Guitonia troglophila* should, therefore, be sought in anchialine caves of Bermuda, the Bahamas, Puerto Rico, or even the Canary Islands and Ascension Island.

Guitonia troglophila Garth & Iliffe, new species
Figs. 1, 2

Type.—Female holotype, AHF No. 871, from Grieta de Caleta la Torta (anchialine cave), Isla Santa Cruz, Islas Galápagos, 8 June 1987, Station 87-018, Thomas M. Iliffe, collector.

Measurements.—Female holotype, length of carapace 9.7 mm, width of carapace 14.2 mm, width of front 4.0 mm, length of major chela 9.9 mm, of major dactyl 4.8 mm, height of palm 5.1 mm.

Description.—Carapace (Fig. 1A) broader than long, transversely oval, regions well demarcated anteriorly, elevations sharply granulate, sparsely hairy, intervening depressions smooth or finely granulate, as is posterior ⅖ of carapace. Front slightly advanced over arc of anterolateral margins, bilobate, lobes straight or, in frontal view (Fib. 1B), sinuous, advancing toward broad median V, edge granulate, a recessed pit, similar to median hiatus as seen from below, separating front from orbital margin. Basal antennal article not touching front; antennules folding transversely. Orbits (Fig. 1C) granulate, postorbital tooth lacking; instead, a postorbital notch communicating with a postorbital depression bounded by a granular ridge above and below, the lower ridge representing the forward continuation of the anterolateral margin, and bearing only a suggestion of the normal first anterolateral tooth. Anterolateral margins arcuate, dentate, teeth sharply granulate; of the five teeth (DENTS) of Dana (1852), only four may be seen, the first tooth (D) obsolescent. Second tooth (E) smallest, located the width of the orbit behind the eye; third tooth (N) largest, its external margin longest of any; fourth tooth (T) similar, but only half as long; fifth tooth (S) small; teeth N, T, S spine-tipped and spinulous-margined, teeth from S to E curving successively forward and inward, imparting a broad arc to entire margin. Carapace convex in both directions, gastric region well defined, hepatic and branchial regions swollen and granulate.

Ischium of external maxilliped (Fig. 1E) longitudinally grooved, merus subquadrate, anterior margin sinuous, slightly produced at anteroexternal angle and recessed at anterointernal angle to receive palpus, surface uneven, granulate.

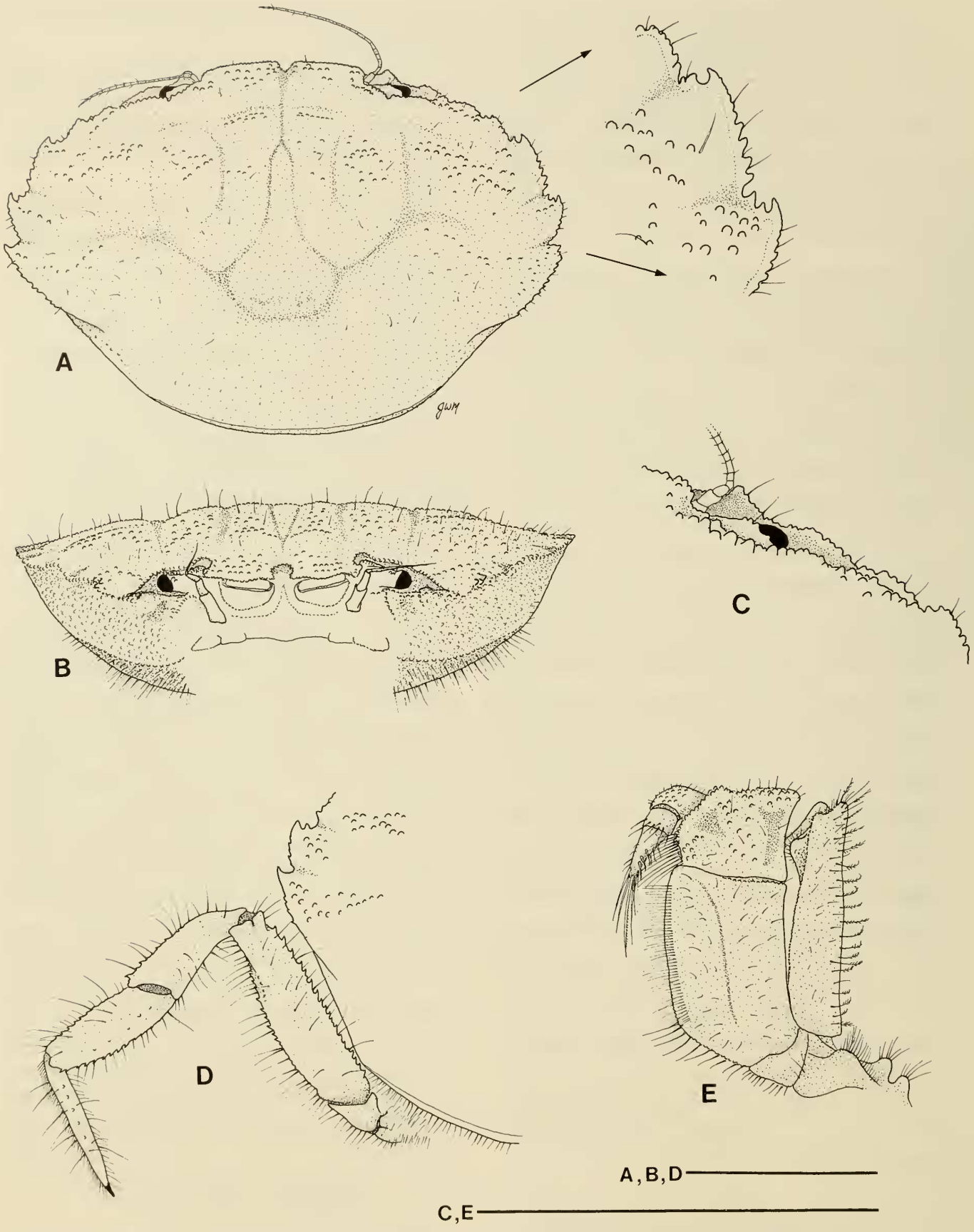

Fig. 1. *Guitonia troglophila,* new species, female holotype, AHF. A, dorsal view of carapace, with detail of anterolateral teeth (E, N, T); B, frontal view of carapace, showing interorbital region; C, dorsal view of right orbital region; D, left fourth walking leg and anterolateral teeth (T, S); E, left outer maxilliped, external view. Scale bar = 5.0 mm. (Drawings by Joel W. Martin.)

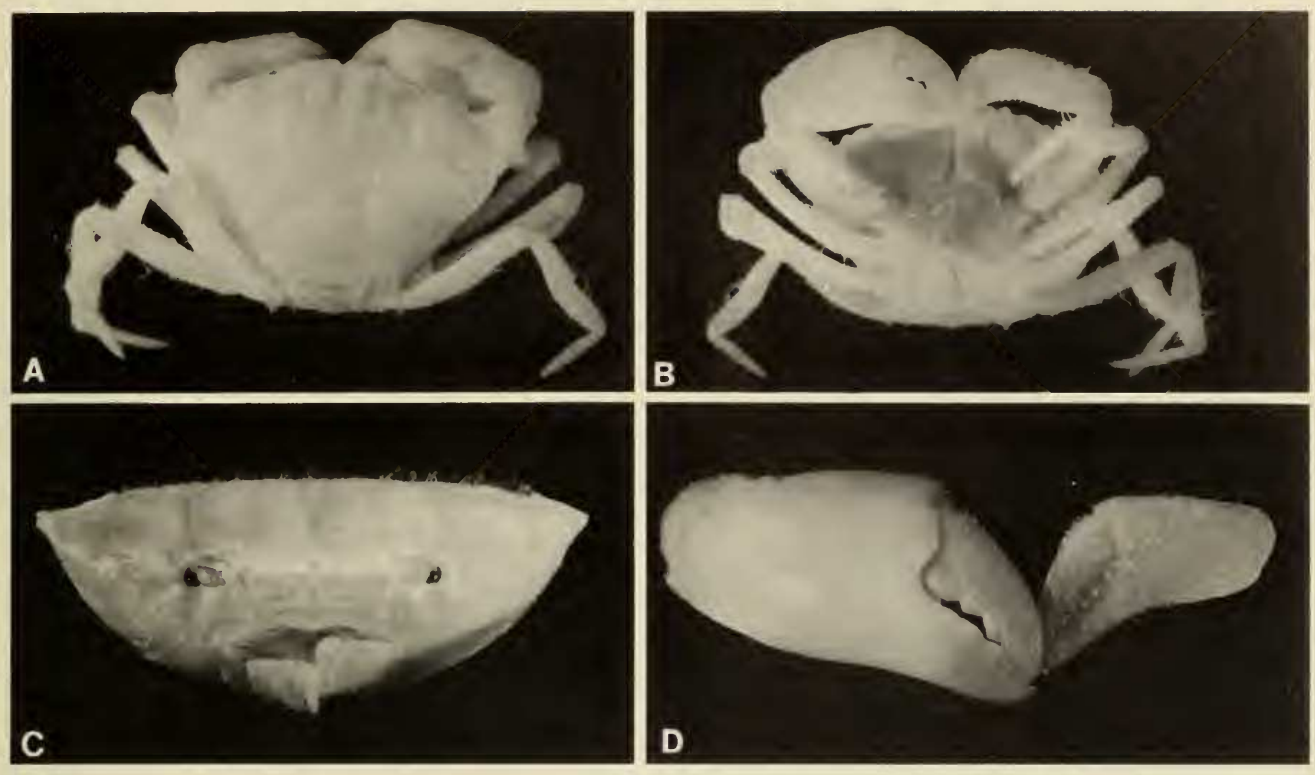

Fig. 2. *Guitonia troglophila*, new species, female holotype, AHF. A, dorsal view; B, ventral view; C, frontal view of carapace; D, outer view of chelipeds. (Photographs by Los Angeles County Natural History Museum.)

Chelipeds (Fig. 2D) unequal, right larger. Major cheliped robust, merus trigonal, margins sharply granulate; carpus granulate, a spine-tipped triangular projection at inner angle; manus granular and hairy, inner superior margin with hooked spinules proximally, upper margin with a granular ridge, lower half of palm smooth and bare, color of propodal finger confined to tip; dactylus with a strong basal tooth, followed by two triangular teeth that interdigitate with two similar propodal teeth. Minor cheliped slender, hairy, spinulate above, fingers strongly deflexed, tips crossing.

Walking legs long, slender, spinuous margined, and hairy, spines often alternately large and small; carpus and propodus of fifth pereiopod (Fig. 1D) together equalling length of merus; dactylus long, straight, but not recurved (as in Goneplacidae), corneous tips amber, incurving.

Abdomen of female with 7 free segments.

Remarks.—*Guitonia troglophila* resembles species of *Micropanope* and a number of other genera with small species as reviewed by Guinot (1967), some of which are panopeine and some xanthine. The troglophilic crab in question cannot readily be placed in any of these genera, yet appears to belong to the ancient fauna of which they are a part. It is therefore placed in a new genus, *Guitonia* Garth, although the female specimen on which it is based does not permit its placement with the certainty that will eventually be possible with the finding of a male and the use of the character of the first pleopod. The uniqueness of the specimen and its unusual provenience appear to justify this course.

Habitat.—Grieta de Caleta la Torta (Fig. 3) is a tectonic fissure located 100 m inland and running parallel to the south coast of Isla Santa Cruz. It is part of a network of similar fissures presumably formed by the slumping along the margins of this volcanic island. A series of deep, clear anchialine pools floored with large collapse boulders are situated at the base of the 20 m deep, 5

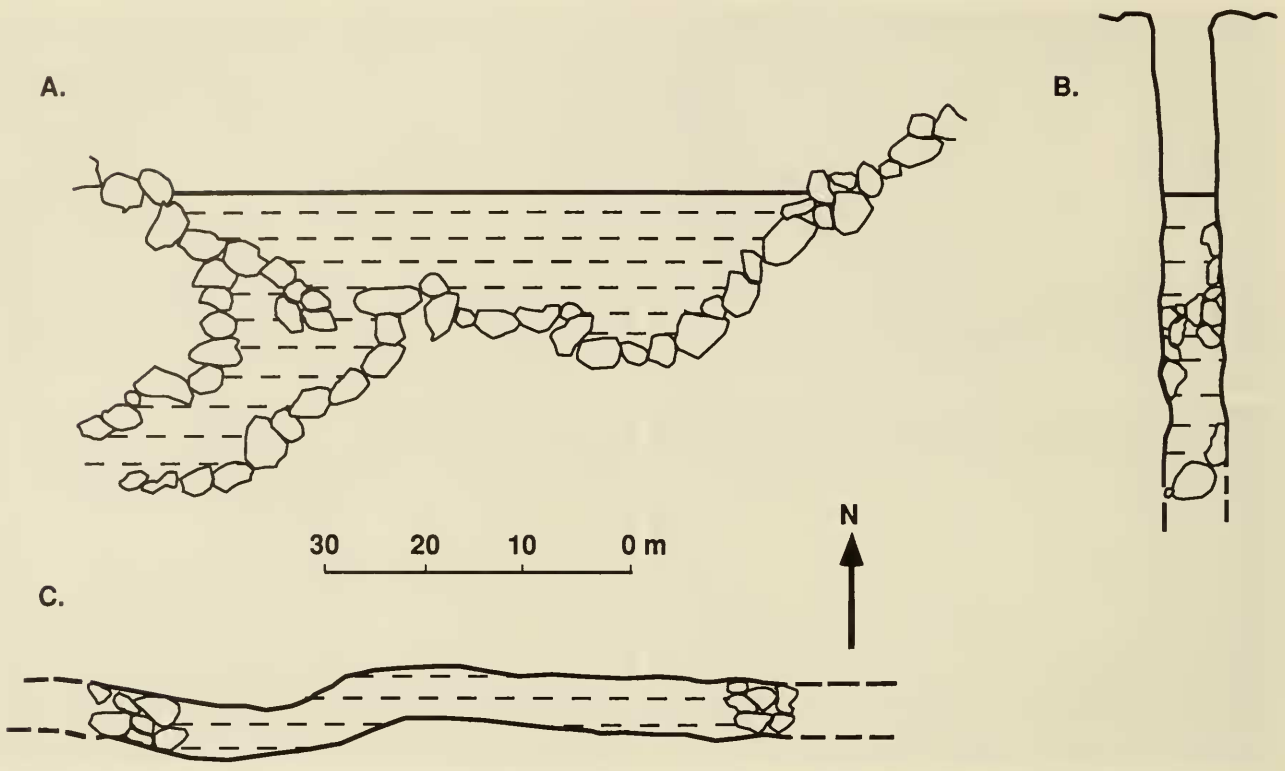

Fig. 3. Profile (A), section (B), and plan (C) maps of Grieta de Caleta la Torta, Isla Santa Cruz, Islas Galápagos. (Drawn by Thomas M. Iliffe.)

m wide fissure. Sections of the pools extend into areas of total darkness beneath wedged breakdown blocks. Salinities at 0, 3 and 17 m depths were 9, 11 and 29 p.p.t., respectively. A single specimen of *Guitonia troglophila* was collected with a plastic bottle trap baited with a crushed crab left overnight at 10 m depth.

Other crustaceans collected from this cave include troglobites showing affinities to deep sea or Caribbean and West Atlantic species (Iliffe 1991). The shrimp *Typhlatya galapagensis* Monod & Cals, 1970, belongs to an exclusively troglobitic genus comprising nine species with distribution including the Galápagos, West Indies, Mexico (Yucatan and Campeche), Ascension Island, and Bermuda. The halocyprid ostracod *Danielopolina styx* Kornicker & Iliffe, 1989, is a member of a genus with both anchialine species on the Yucatan Peninsula, Cuba, the Bahamas and Canary Islands and a deep-sea species in the equatorial Atlantic. The cypridinid ostracod *Skogsbergia galapagensis* Kornicker & Iliffe, 1989, is most closely related to a congener, *S. lerneri* (Kornicker, 1958), an open water species distributed in the Gulf of Mexico and Caribbean Sea. Three species of blind troglobitic amphipods collected from this pool each represent a different family. *Galapsiellus leleuporum* (Monod, 1970) from the family Melitidae is present in other anchialine pools on both Islas Santa Cruz and Isabela. It is apparently derived from the widespread marine genus *Eriopisa* (Barnard, 1976). Both *Antronicippe serrata* Stock & Iliffe, 1990 (family Pardaliscidae) and *Valettietta cavernicola* Stock & Iliffe, 1990 (family Lysianassidae) belong to families with predominantly deep-sea members. Additionally, *Antronicippe* is closely related to *Spelaeonicippe,* a genus with two species inhabiting anchialine caves in the Canary Islands and West Indies. The epacteriscid copepod *Enantiosis,* a genus containing only anchialine or crevicular members, is represented by a species most closely related to an anchialine

form from Bermuda (A. Fosshagen, pers. comm.). A caridean shrimp collected from the deepest sections of the cave may belong to the genus *Parhippolyte,* an anchialine group widely distributed in the tropical Indo-Pacific (A. J. Bruce, pers. comm.).

Considering the nature of the habitat from which *Guitonia troglophila* was collected, it is likely that this crab is restricted to similar anchialine environments within the Galápagos. Grieta de Caleta la Torta was one of the richest collecting sites found in these islands in terms of numbers of troglobic taxa. At least 8 other obligate anchialine taxa, including 3 species of amphipods, 2 ostracods, 2 shrimps, and a copepod were found there. The presence of such a rich and diverse obligate anchialine fauna testifies to the isolation of this grieta from the sea and its suitability as a habitat for anchialine species. The fact that some light penetrates into the shallower waters of the pool during the day is not significant, as anchialine shrimps are elsewhere commonly found in illuminated, but land-locked pools (see Holthuis 1973), although they regularly disappear into, and are apparently dispersed through, lightless subterranean channels.

Acknowledgments

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